Watershed Model – Predictor of Water Quality?

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The Agriculture Non-point Pollution Source (AGNPS) model has been used in Iowa and other states to estimate nutrient and sediment delivery rate to lakes. It incorporates 23 parameters from the watershed to estimate nutrient and sediment delivery from the watershed.

In 1997, two ephemeral streams in the Red Haw Lake watershed and three ephemeral streams in the Ahquabi Lake watershed were selected as sampling sites to validate this model. A 90^{o} flume was installed in each ephemeral stream and recording rain gauges and sampling equipment borrowed from the State Hygienic Laboratory was used to collect rainfall data, water flow data through the flumes, and to collect water samples during flows. Water samples were analyzed to measure Total Nitrogen, Total Phosphorus, Total Suspended Solids, and Turbidity.

Equipment failure in 1997 and 1998 resulted in only five samples being collected in the Red Haw watershed and two samples collected from the Ahquabi Lake watershed. During 1999, new flow meters to measure water flow height and velocity were installed. In 2000, new flumes compatible with the sampler programs were installed in both watersheds. Sufficient samples were collected during 2001 in each watershed to initiate model validation. During 2001 six samples were collected from each Ahquabi sub-watershed sampler, nine samples were collected from one Red Haw sub-watershed sampler, and ten samples were collected from the second Red Haw sub-watershed sampler. During 2003, no samples were collected in the Lake Ahquabi watershed because new ponds were constructed upstream of each sampler. These ponds did not allow any runoff to reach the samplers. Preliminary results indicate the (AGNPS) model is predictable, but our data shows sediment delivery and water flow differs greatly from the model predictions in both 2001 and 2002. More samples are needed to find out if the variations between predicted and field results continue.

No samples were collected in 2003 because of insufficient rainfall and no samples were collected in 2004 because of budget constraints.